HARKEN®

SMALL BOAT UNDERDECK FURLER

477, 493, 478

Installation and User Manual – Intended for specialized personnel or expert users

4428 5/15

Preassembly

Safety precautions/terms/general information	2
Parts descriptions/specifications	3

Planning Installation

Hoistable halyard swivel	4
Tools	4
Furler requires drained compartment	5

Assembly

Stay loading	5
Stay angle	5
Deck plate	6

Commissioning

Furling line	7
Upper swivel	8

Operation

Unfurling/furling	8

Maintenance

Clean	8
Inspect	8
Maintenance	8

Deck Drill Templates

477 Small Boat underdeck furler	9 - 10
493 Medium underdeck furler	11 - 12
478 Small Boat underdeck furler	13 - 14

Appendix

Sailmaker instructions	15

Addresses 16

Please read these instructions carefully before installing, servicing, or operating the equipment.
This manual may be modified without notice. See: www.harken.com/manuals for updated versions.
PLEASE SAVE THESE INSTRUCTIONS

Introduction

This manual gives technical information on installation and service. This information is ***destined exclusively*** for specialized personnel or expert users. Installation, disassembling, and reassembling by personnel who are not experts can cause serious damage to property or injury to users and those in the vicinity of the product. If you do not understand an instruction, contact Harken.

The user must have appropriate training in order to use this product.

Harken accepts no responsibility for damage or harm caused by not observing the safety requirements and instructions in this manual. See limited warranty, general warnings and instructions at www.harken.com/manuals.

Purpose

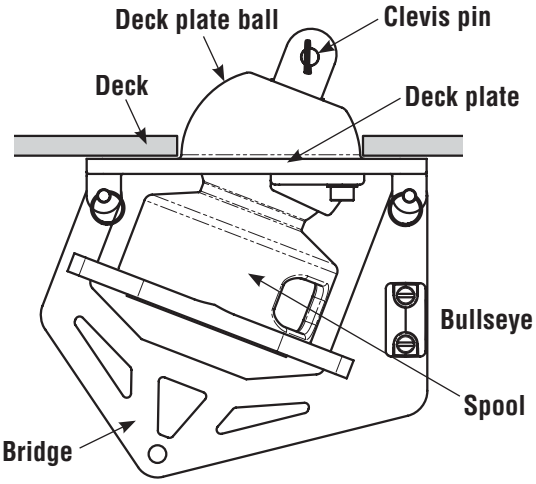
Harken jib furling is designed to roll sails on sailboats so wind has little effect on the sail. Use of this product for other than normal sailboat applications is not covered by the limited warranty.

Safety Precautions

WARNING! Strictly follow all instructions to avoid potential hazards that can kill or hurt you and others. See www.harken.com/manuals for general warnings and instructions.

Swivel assembly

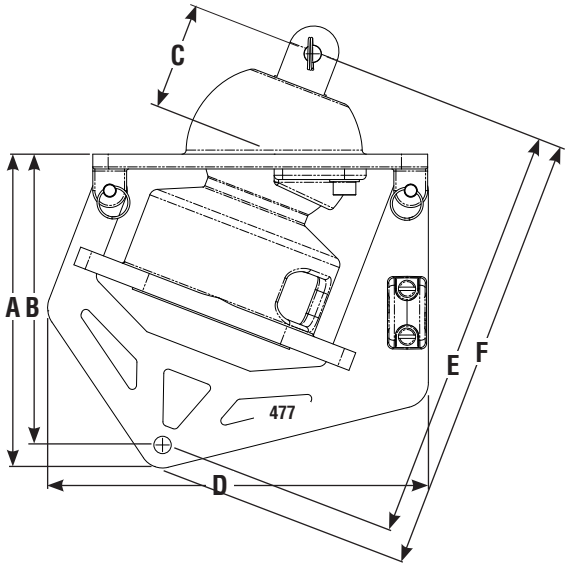
Drum assembly

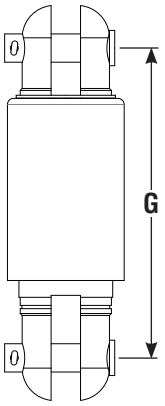


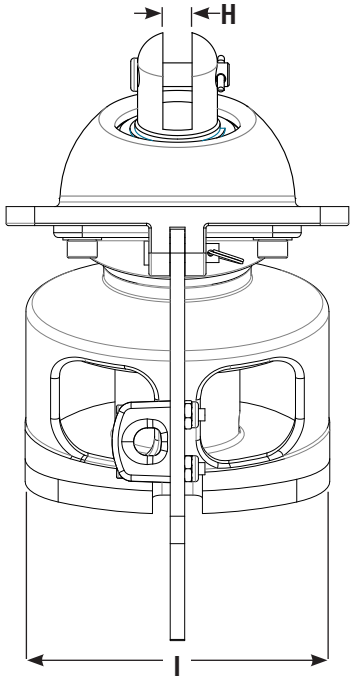
		Clevis pin Ø		Maximum working load		Line Ø	
Furler	Description	in	mm	lb	kg	in	mm
477	Underdeck furler/small	1/4	6	950	431	1/8 – 5/32	3 – 4
493	Underdeck furler/medium	5/16	8	2000	907	5/32 – 3/16	4 – 5
478	Underdeck furler/large	7/16	11	3000	1361	3/16 – 1/4	5 – 6

Parts Descriptions and Specifications

Furler	A		B		C		D		E		F		G		H		I	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
477	4 5/8	118	4 5/16	147	1 9/16	40	5 5/8	143	6 3/16	157	6 9/16	166	2 1/2	64	5/16	8	3	76
493	5 11/16	144	5 5/16	135	1 13/16	45	7	179	7 3/8	188	7 13/16	198	4	102	3/8	9.5	4	100
478	7	177	5 3/4	147	2 7/16	61	9 3/8	238	8 1/2	215	9 1/2	240	4 3/4	121	7/16	11.5	5 1/2	140







Components

Furler	Upper swivel Part No.	Hoistable swivel Part No.	Drum Part No.	Weight Upper swivel oz	Upper swivel g	Hoistable swivel oz	Hoistable swivel g	Drum oz	Drum g
477	164	464*	HC9226	2.6	74	2.9	82	24	680
493	207	465*	HC10893	9.2	261	8.9	252	42.6	1201
478	HCP141	482*	HC9976	15	431	16.8	477	81	2296

*Hoistable halyard swivels (464, 465, 482) are not included with 477, 493, or 478.

Part No.	in	mm
464	4 3/16	124
465	5 11/16	144
482	7 19/32	193

Tangs for Attaching Sail to Lower Unit

Furler	Tack adapter tang Part No.	Pin-to-pin length in	Pin-to-pin length mm	Wire Ø in	Wire Ø mm	Clevis pin Ø in	Clevis pin Ø mm	Weight oz	Weight g	Weight lb	Weight kg
477	HCP649*	3/4	19	1/8	3	1/4**	6**	—	—	—	—
493	489	1 3/8	35	5/32	4	5/16**	8**	—	—	—	—
478	479	1 1/2	38	5/32	4	5/16**	8**	5.2	147	3000	1361
478	480	1 1/2	38	3/16	5	3/8**	10**	5.2	147	3000	1361
478	481	1 1/2	38	7/32	6	7/16**	11**	5.2	147	3000	1361

*See parts required below. **Upper tang hole pin size listed.

*The following parts must be ordered with the HCP649

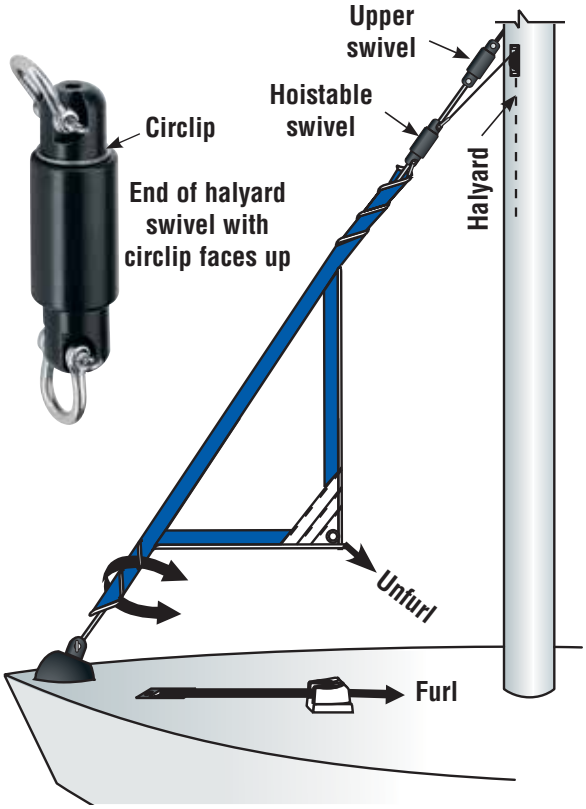
Part No.	Qty	Description
HCP650	2	Neoprene O-ring
HFS118	1	Cotter pin 1/16 X.500 18-8
HSB99	1	Clevis pin 1/4 X .672 SS

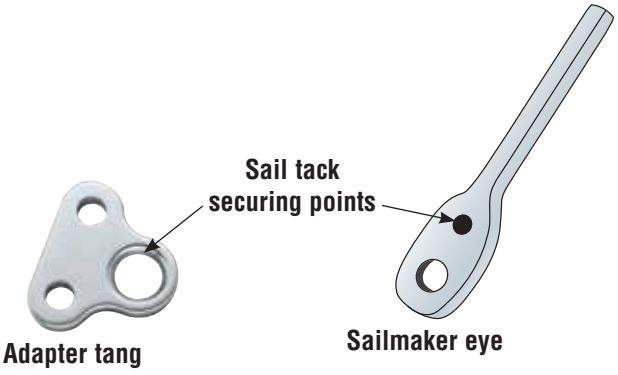
Hoistable Halyard Swivel

An optional hoistable ball bearing halyard swivel can be installed on headstay to raise or lower the sail without removing headstay. Hoistable halyard swivels are independent of headstay, allowing luff to be tensioned separately from mast rake. Hoistable swivels work along with standard Harken Small Boat furler.

IMPORTANT! Hoistable halyard swivel must be loaded on stay before terminals are made. Make sure the end with circlip is facing up.

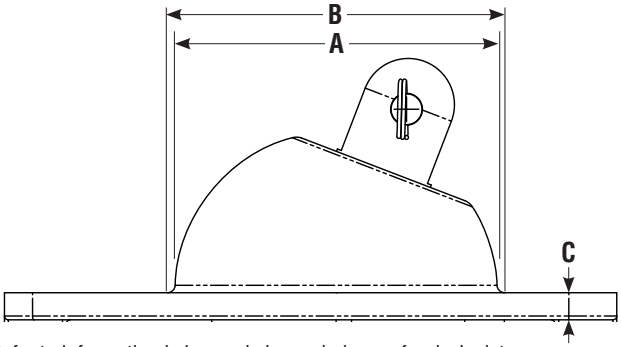
When using hoistable halyard swivel adapter tangs provide a "Y" attachment to connect both stay and sail tack to lower unit. A sailmaker eye may also be used. The eye consists of a swage marine eye with a hole designed for lashing or shackling the tack to terminal.





Tools/Parts You Will Need

1. Hole saw	5. Deck sealant
2. Center punch	6. File for beveling
3. Scissors	7. Wrench for deck plate bolts
4. Rigging or black tape	8. Power drill/drill bit for pilot holes



Fasteners for Mounting Unit to Deck (Not Supplied)

Unit	Fastener Ø	C–deck plate thickness*
477	5 mm	1/4" (6 mm)
493	5 mm	1/4" (6 mm)
478	6 mm	3/8" (10 mm)

*Add deck thickness to this measurement

Hole Saw Size – Refer to information below and choose hole saw for deck plate.

	Deck Plate Ball Ø				Recommended Hole Saw Ø			
	A		B		Requires some beveling		Requires no beveling	
Unit	in	mm	in	mm	in	mm	in	mm
477	2.6	66	2.7	68.5	2.5 or smaller*	65 or smaller*	2.75	70
493	3	76	3.25	83	3 or smaller*	75 or smaller*	3.25	85
478	4.25	108	4.5	114	4.25 or smaller*	110 or smaller*	4.5	115

* A smaller hole than listed may be used to fashion a socket in the deck to conform to the ball shape. This can improve appearance and reduce amount of sealant required. See drilling template in appendix.

Planning Installation

Furler Requires Drained Compartment

The drum assembly is designed to keep much of the water from entering the compartment. Water will drip through furler during rain, or when sailing in heavy weather.

IMPORTANT! Furling compartment must drain.

Assembly

Stay Loading

The drum assembly is designed for either transferring headstay loads to deck or for transferring the loads to an underdeck chainplate.

If securing to deck only, make sure deck is strong enough and designed for this purpose. A cored deck will not provide adequate strength.

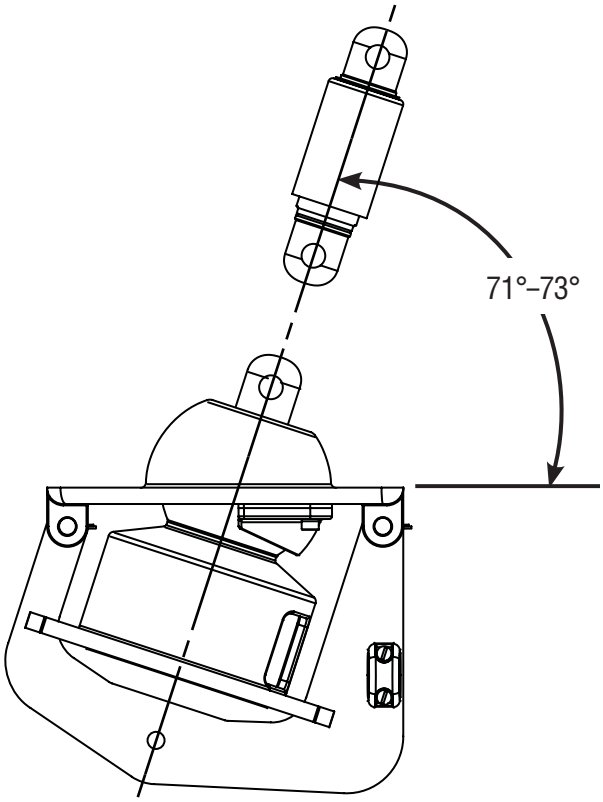
Use stay attachment belowdeck. A turnbuckle is used to connect chainplate to bridge on furler. It must be carefully tensioned as mast is tensioned to neutralize load on deck.

Turnbuckle to bridge

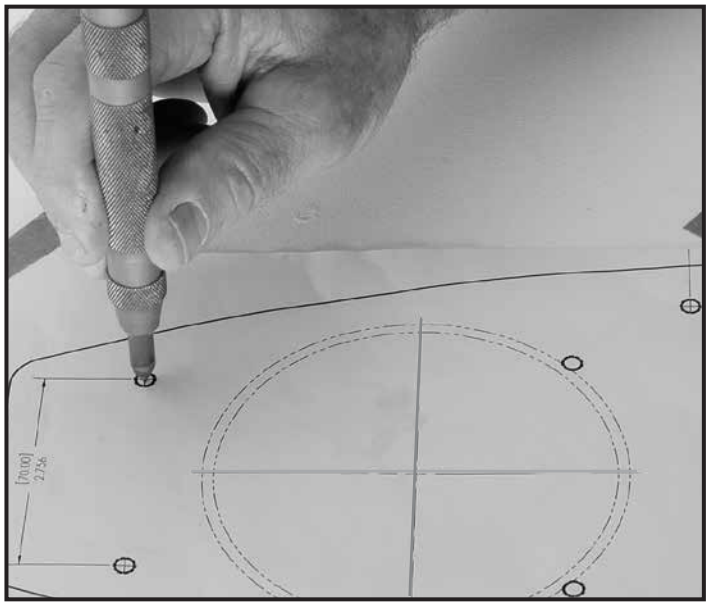
Stay Angle

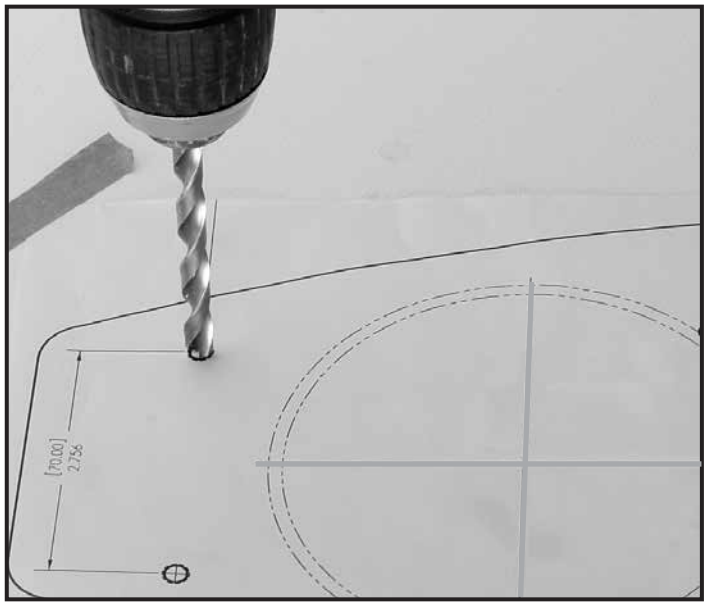
The Harken deck plate angle matches a stay angle of 72° when compared to deck. Stay angle can vary between 71° and 73°.

IMPORTANT! If stay angle does not fall between 71° to 73° furler will be difficult to furl and can create excessive force on deck and furler. To correct problem, change mast rake or make shims using structural epoxy.



Carefully locate center point in deck to locate deck plate. Line from mast to underdeck chainplate must intersect this center point. Mark center fore/aft and athwartships lines. Line up template. Mark four outer holes and center pilot hole. Make sure closer pair of holes is forward. Mark center hole for drilling large hole.





If using an interior chainplate, check hole position by drilling pilot hole and running a low stretch line from masthead to chainplate.

Tip: After pilot drill bit clears deck, drill final hole from bottom using pilot hole to line up hole drilled from top. This will prevent glass from chipping.

Tip: Run line through fairlead and deadend line into spool before mounting lower unit.

Make sure hole is just large enough so deck plate bears against deck. It is better to make hole slightly smaller and file opening larger to fit. Use template to mark large hole and bolt holes. Once hole is located in line with chainplate and required shimming is done, drill hole 90° to deck.

Use screws, washers, and deck sealant to fasten lower unit to deck (see chart at right).

Note: Make sure there is sufficient thread engagement into deck plate.

Furler	Minimum thread in deck plate
477, 493	1/4" (6 mm)
478	3/8" (10 mm)

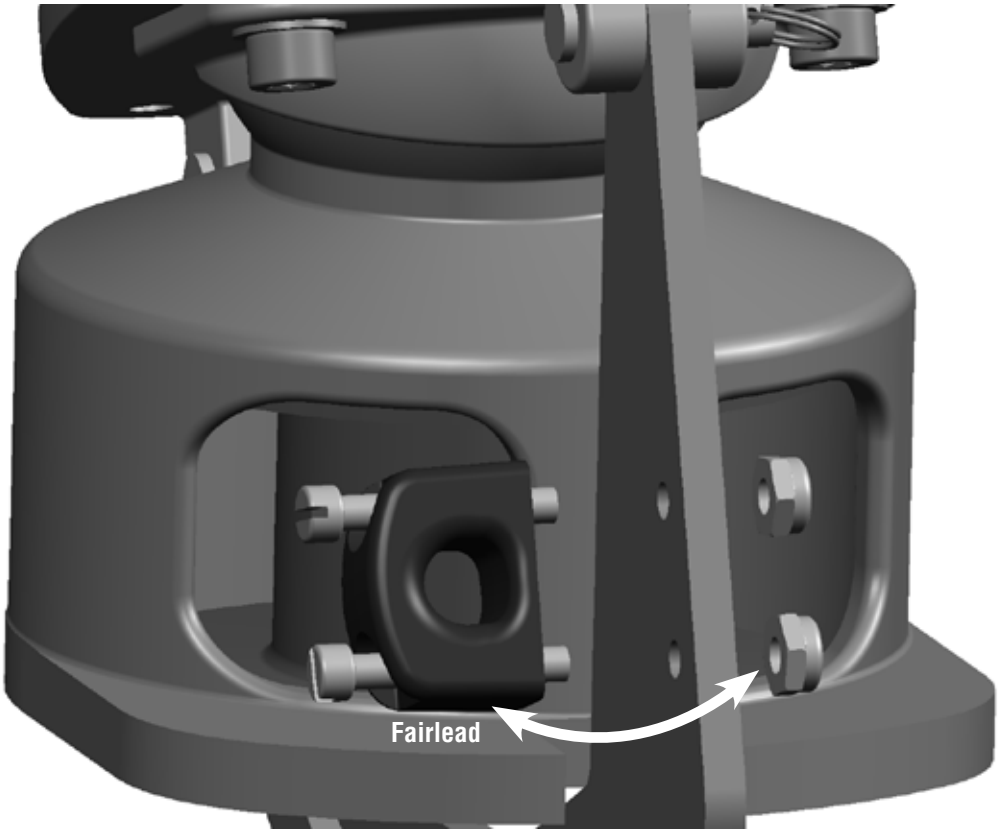
Deadend line before mounting

To figure line length, measure distance from furler to furling cleat. Add length indicated below.

Part No.	Line Ø		Measure distance from furler to cleat and add	
	in	mm	ft	m
477	1/8 – 5/32	3 – 4	10	3
493	5/32 – 3/16	4 – 5	13	4
478	3/16 – 1/4	5 – 6	15	4.5

Determine Fairlead Location - The fairlead location determines furling direction. The furler is shipped with fairlead mounted on side of bridge. Refer to chart below to determine if port fairlead mounting will work. If necessary, remove fairlead and assemble on starboard side.

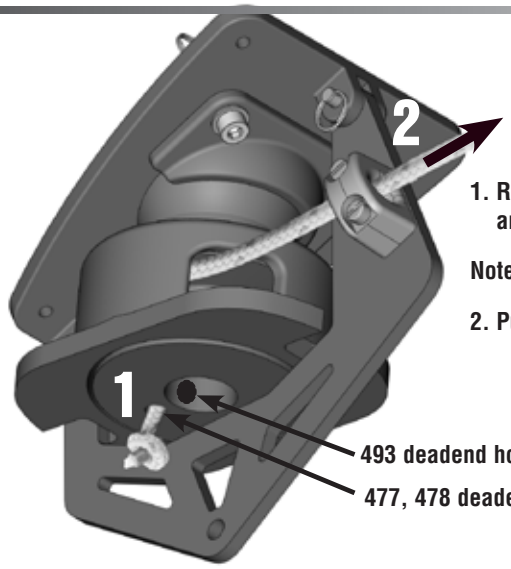
Fairlead side	Furling direction	Charge spool by rotating	Suncover (if used) on
Port	Counterclockwise	Clockwise	Starboard
Starboard	Clockwise	Counterclockwise	Port



Switch fairlead for opposite furling rotation

Set up lead block so furling line runs perpendicular to drum when line leaves bullseye. The bullseye can correct small differences in line angle. Lead line aft using ball bearing blocks where line makes a turn more than 30°. Install cleat.

Feed line through bullseye and into nearest opening.

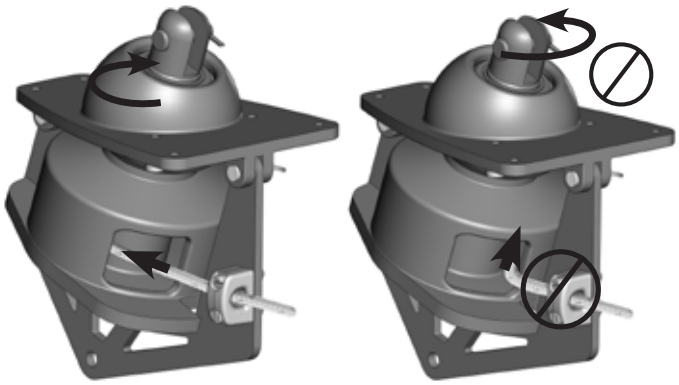


1. Run line out of hole in bottom of spool and tie a single overhand knot.

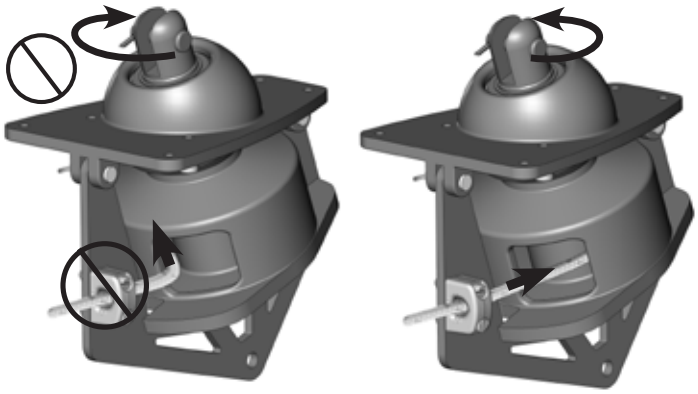
Note: On 493 deadend hole is in hub.

2. Pull knot back up to seat at hole.

Counterclockwise furling direction
Rotate drum clockwise to charge spool.
Wind 10-15' (3-4.5 m) of line on spool.



Clockwise furling direction
Rotate drum counterclockwise to charge spool.
Wind 10-15' (3-4.5 m) of line on spool.



Commissioning — Upper Swivel

Attach upper swivel to jib halyard. Fasten head of unfurled jib to upper swivel and attach tack to top of drum. Hoist sail with halyard, snug up, and cleat. When using hoistable swivel, attach head of sail to shackle.

Operation — Unfurling/Furling

To furl jib, pull furling line to roll sail up around its own luff. To unfurl, uncleat furling line and pull jib sheet.

Maintenance — Inspect/Clean

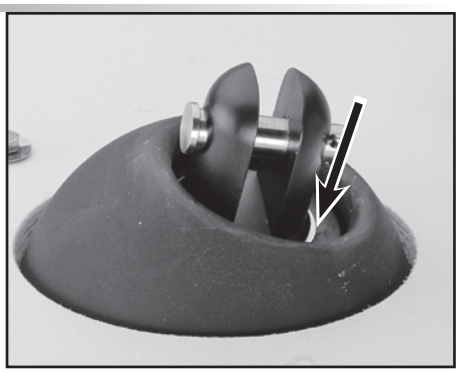
Inspect

1) Unit for signs of chafe, wear, or damage.
2) Rigging components for signs of stress/corrosion.
4) Turnbuckle below drum or inside torque tube for signs of loosening.
5) Headstay tension for signs of loosening.
6) All clevis pins, locking rings, and cotter pings to make sure they are secure.
7) Wire for signs of wear or unraveling.

Maintenance

Keep unit clean. When washing boat, flush unit with soap and fresh water. Occasionally lower sail and flush halyard swivel with soap and fresh water.

To clean drum bearings, squirt mild detergent and water solution into small gap between plastic ball and spool extension as shown at right. Spin drum and let soak. Follow with one minute flushing with hose.



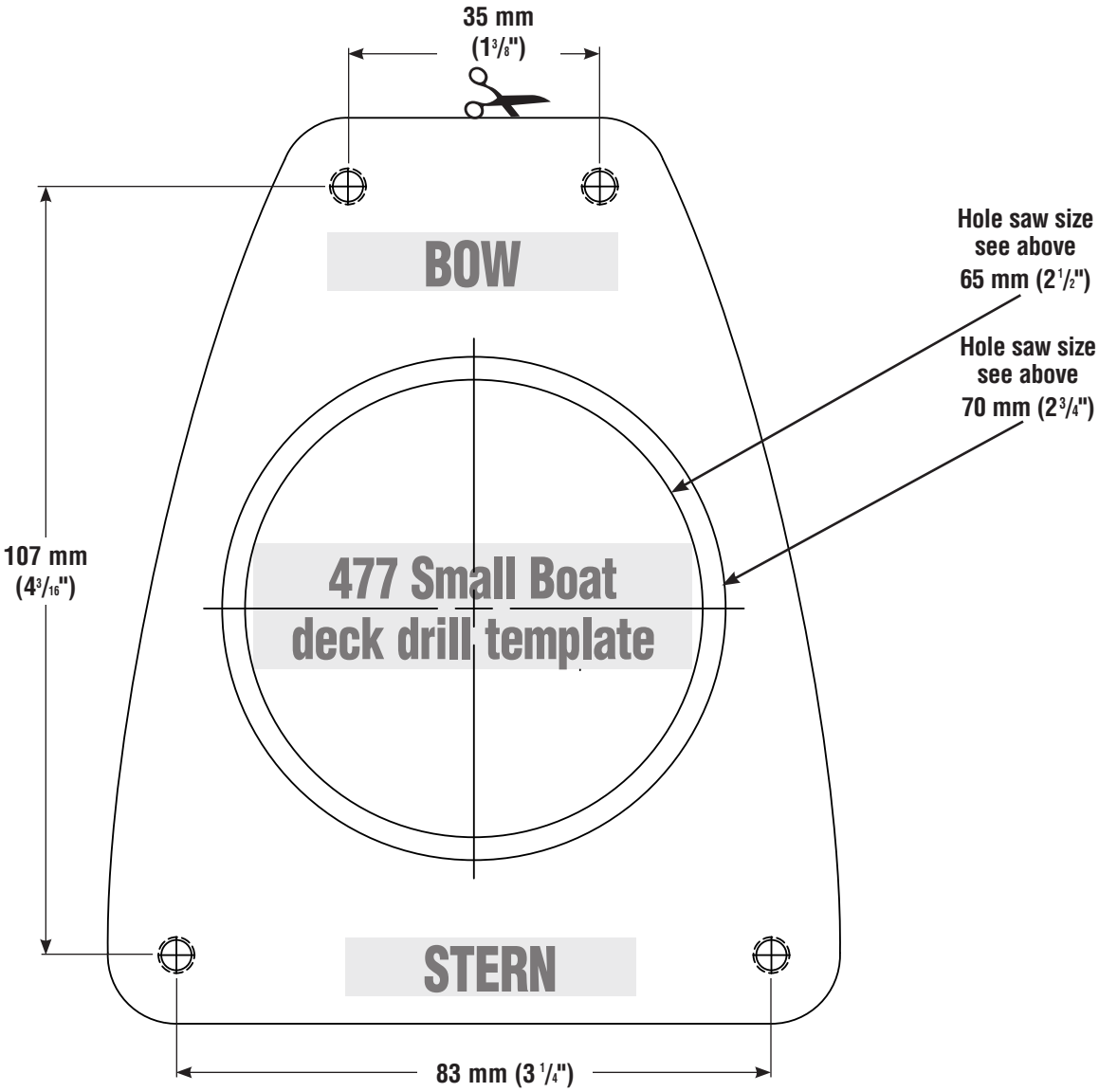
Clean drum bearings

477 Small Boat Underdeck Furler Deck Drill Template

Hole Saw Size Recommendations. Read before drilling.

65 mm (2 1/2") – Requires some beveling of bottom edge of deck hole to provide a good fit. Alternatively, a smaller hole may be used to fashion a socket in deck to conform to ball shape. This may improve appearance and reduce amount of water that enters.

70 mm (2 3/4") – Use if no beveling to underside of deck is desired.



IMPORTANT! When printing this template from a computer file, measure to confirm template is correct size.

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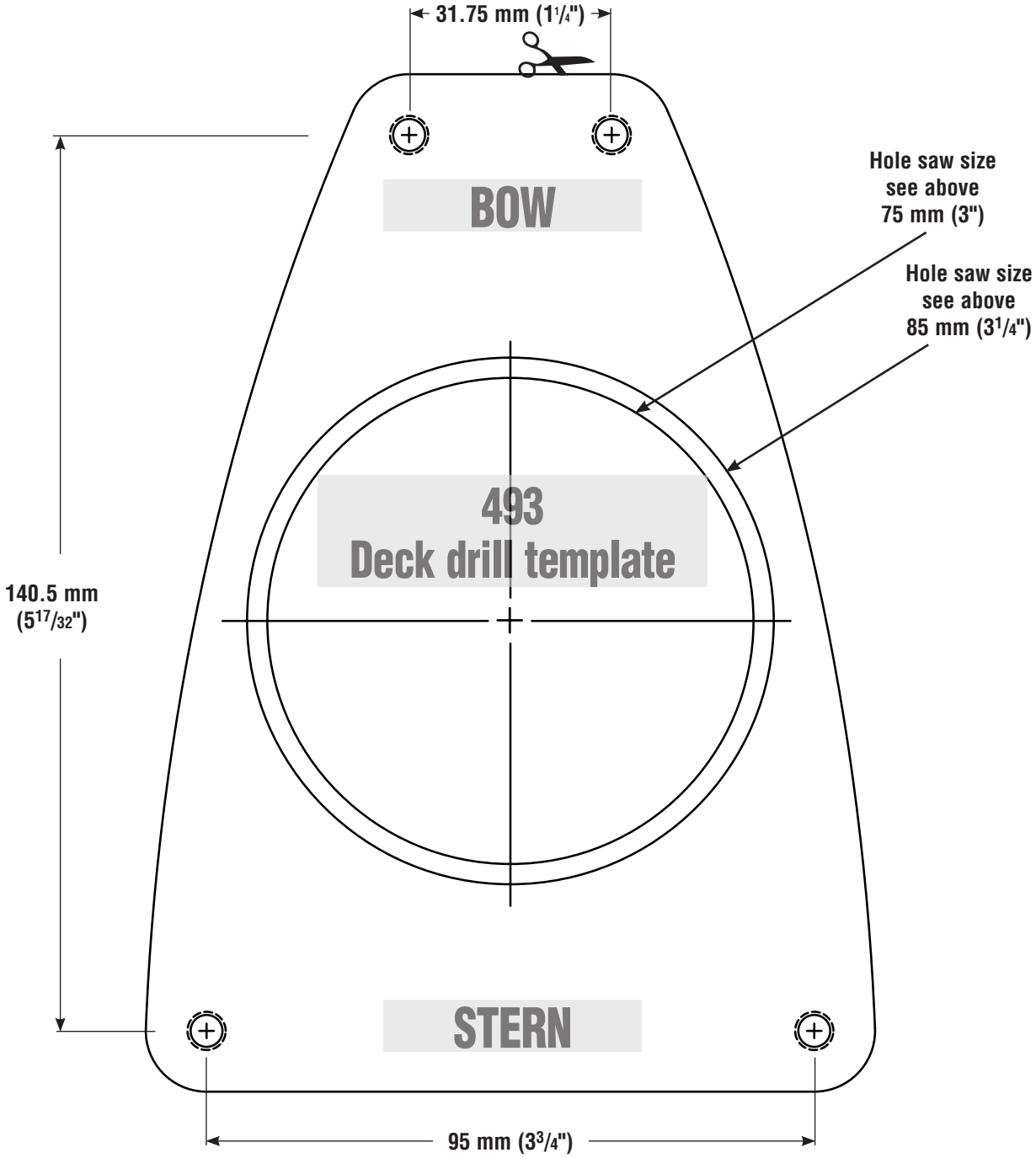
Hole Saw Size Recommendations. Read Before Drilling.

75 mm (3") – Requires some beveling of bottom edge of deck hole to provide a good fit. Alternatively, a smaller hole may be used to fashion a socket in deck to conform to ball shape. This can improve appearance and reduce amount of water that enters.

85 mm (3 1/4") – Use if no beveling to underside of deck is desired.



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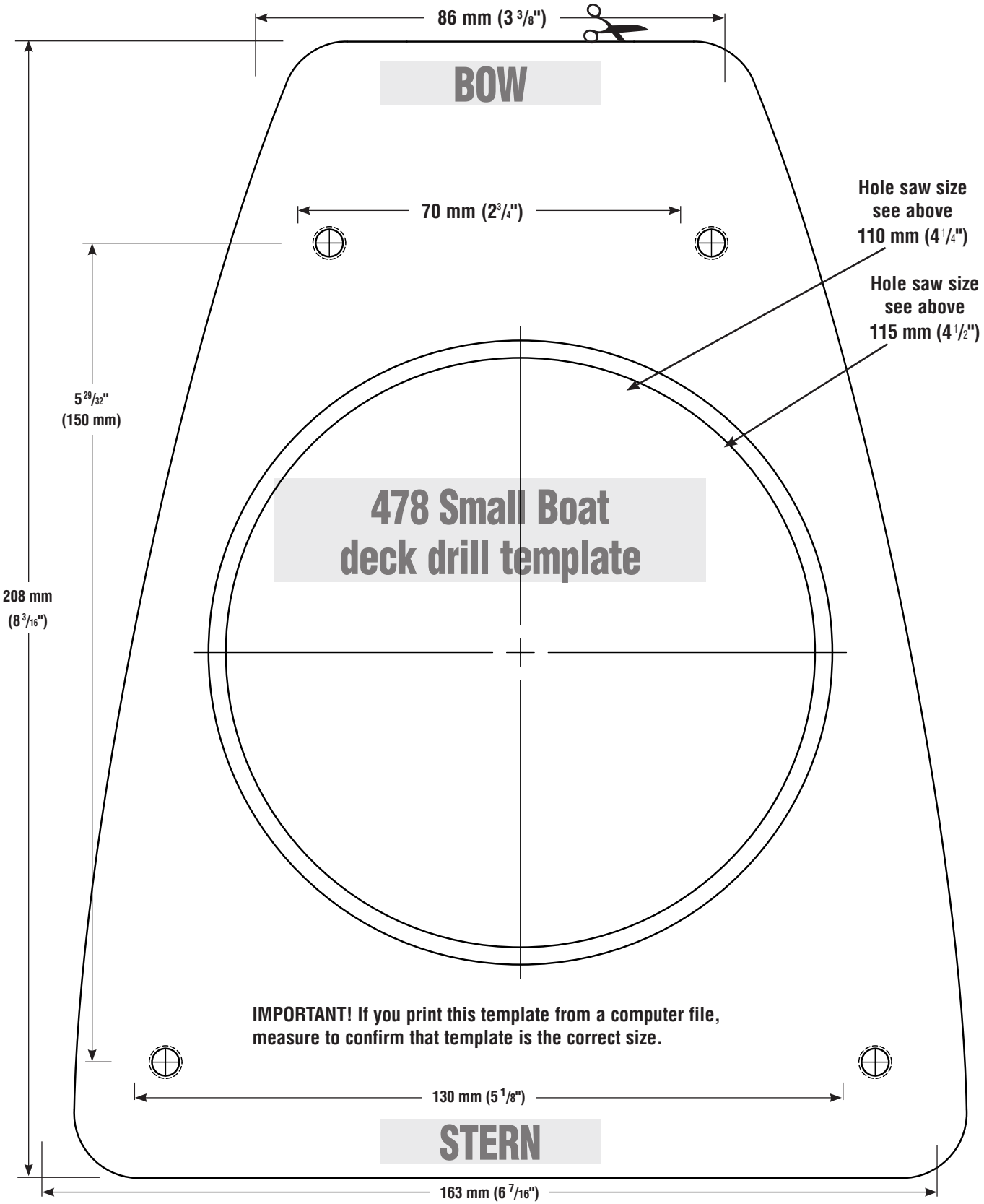
Hole Saw Size Recommendations. Read Before Drilling.

110 mm (4 1/4") – Requires some beveling of bottom edge of deck hole to provide a good fit. Alternatively, a smaller hole may be used to fashion a socket in deck to conform to ball shape. This may improve appearance and reduce amount of water that enters.

115 mm (4 1/2") – Use if no beveling to underside of deck is desired.

31.75 mm (1 1/4")


86 mm (3 3/8")
BOW
70 mm (2 3/4")
Hole saw size see above 110 mm (4 1/4")
Hole saw size see above 115 mm (4 1/2")
5 29/32" (150 mm)
208 mm (8 3/16")
478 Small Boat deck drill template
IMPORTANT! If you print this template from a computer file, measure to confirm that template is the correct size.
130 mm (5 1/8")
STERN
163 mm (6 7/16")

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Consult specifications for swivel and drum pin-to-pin lengths to determine luff length deductions. If using optional hoistable halyard swivel, make sure to deduct for this.

Standard Upper Swivel Only
Sailmaker will often install a 1 x 19 stainless steel wire sewn into the luff with thimbles that are secured to the tack and head so they will not turn while furling. In this case, the luff wire becomes the headstay. The jib remains on the boat in its furled position when it is not in use and a cover protects the sail from UV exposure. Alternatively a temporary "mast assist" line is used.

Direction of Wire Lay (All Installations)
When installing wire, coordinate the lay of wire with direction of furling so twist in strands are tightening when sail is pulling aft as it is furled. The furler may be set up to work in either direction. Consult the chart below and note load direction on the wire strands.

Fairlead side	Spool charged	Sail rolled	Load on wire strands
Port	Clockwise	Counterclockwise	Clockwise
Starboard	Counterclockwise	Clockwise	Counterclockwise

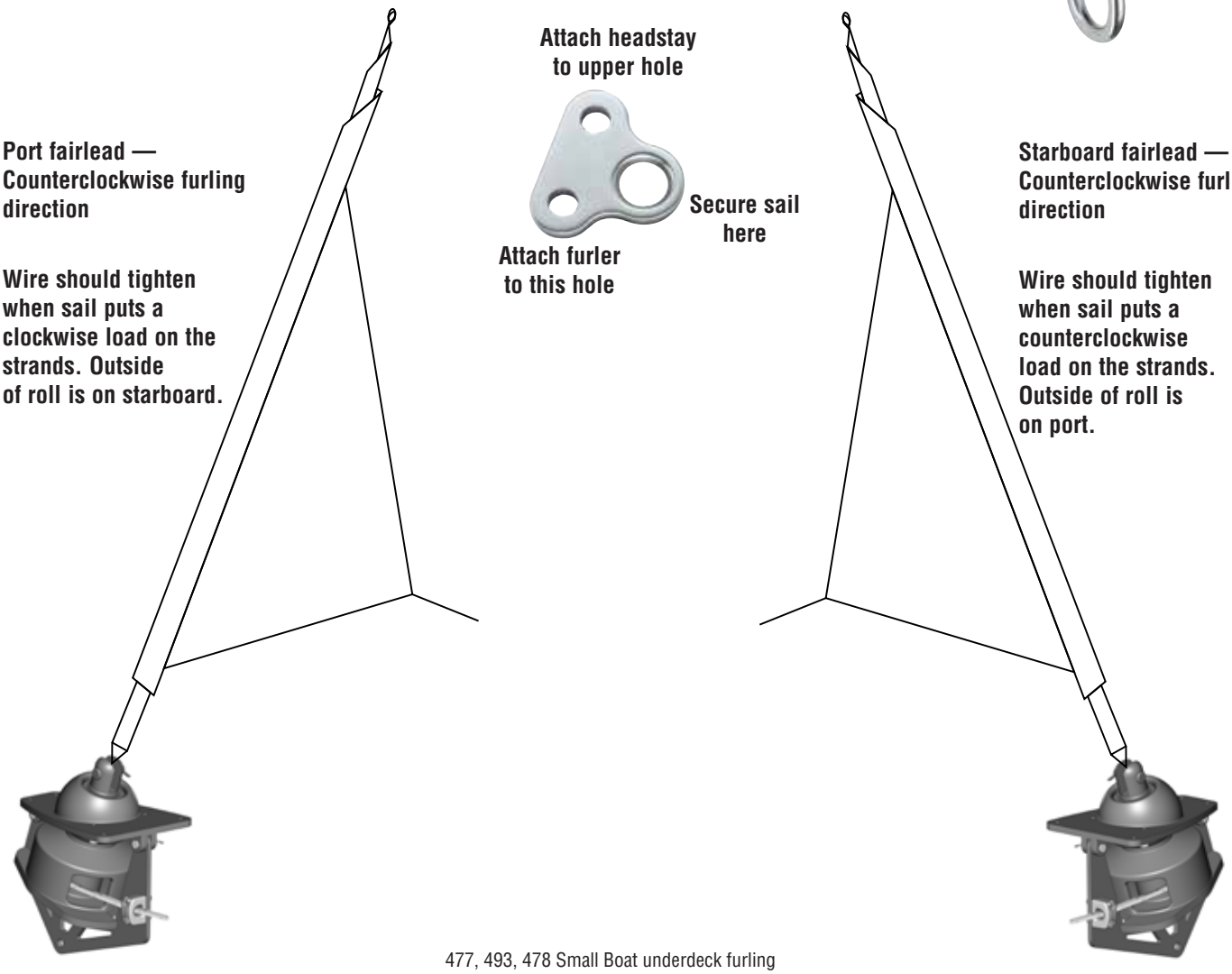
Note: The outside of the roll will be on starboard. See diagram below.

Hoistable Halyard Swivel: If a hoistable halyard swivel is used, the sailmaker will use a luff sleeve or small snap straps so sail can be hoisted onto a permanent stay and removed with the headstay left in place. Make sure head and tack thimbles are secured to sail to handle furling loads.

IMPORTANT! Load hoistable halyard swivel onto stay before terminals are assembled.

Use tangs to provide a sail attachment to lower furler. A sailmaker eye may also be used.

End of halyard swivel with circlip faces up


Attach headstay to upper hole
Secure sail here
Attach furler to this hole
Port fairlead — Counterclockwise furling direction
Wire should tighten when sail puts a clockwise load on the strands. Outside of roll is on starboard.
Starboard fairlead — Counterclockwise furling direction
Wire should tighten when sail puts a counterclockwise load on the strands. Outside of roll is on port.

HARKEN®

Corporate Headquarters
N15W24983 Bluemound Rd, Pewaukee, WI 53072 USA
Telephone: (262) 691-3320 • Fax: (262) 701-5780
Web: www.harken.com • Email: harken@harken.com

Harken Australia Pty, Ltd.
1B Green Street, Brookvale, N.S.W. 2100, Australia
Telephone: (61) 2-8978-8666 • Fax: (61) 2-8978-8667
Web: harken.com.au • Email: info@harken.com.au

Harken France
ZA Port des Minimes, BP 3064, 17032 La Rochelle Cedex 1, France
Telephone: (33) 05.46.44.51.20 • Fax: (33) 05.46.44.25.70
Web: harken.fr • Email: info@harken.fr

Harken Italy S.p.A.
Via Marco Biagi, 14, 22070 Limido Comasco (CO) Italy
Telephone: (39) 031.3523511 • Fax: (39) 031.3520031
Web: harken.it • Email: info@harken.it

Harken New Zealand, Ltd.
158 Beaumont Street
Unit 11, Orams Marine Centre
Westhaven, Aukland, 1010, New Zealand
Telephone: (64) 9-303-3744 • Fax: (64) 9-307-7987
Web: harken.co.nz • Email: harken@harken.co.nz

Harken Polska SP ZOO
ul. Rydygiera 8, budynek 3A, lokal 101, I piętro, 01-793 Warszawa, Poland
Tel: +48 22 561 93 93 • Fax: +48 22 839 22 75
Web: harken.pl • Email: polska@harken.pl

Harken Sweden AB
Main Office and Harken Brandstore: Västmannagatan 81B
SE-113 26 Stockholm Sweden
Telephone: (46) 0303 61875 • Fax: (46) 0303 61876
Mailing address: Harken Sweden AB, Box 64, SE -440 30 Marstrand
Web: harken.se • Email: harken@harken.se

Harken UK, Ltd.
Bearing House, Ampress Lane, Lymington, Hampshire S041 8LW, England
Telephone: (44) 01590-689122 • Fax: (44) 01590-610274
Web: harken.co.uk • Email: enquiries@harken.co.uk

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